CHIEF DIRECTORATE OF OCCUPATIONAL HEALTH AND SAFETY

MAJOR HAZARD INSTALLATION REGULATIONS AWARENESS

3 JUNE 2025

Rachel Aphane

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Employment and Labour
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Content

- Mandate : Occupational Health and Safety Act
- Who are we?
- Advisory Council
- Major Hazard Installations Key Provisions
  - Purpose

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Occupational Health and Safety Act

Bill of Rights- Constitution of South Africa

24. Everyone has the right

a. to an environment that is not harmful to their health or well-being; and

b. to have the environment protected, **for the benefit of present and future generations, through <u>reasonable legislations</u> and other measures that ….**

Purpose of OHS Act, 83 of 1993

- to protect for the health and safety of persons at work (employees, visitors, contractors & regulators)
- persons in connection with the use of plant and machinery (operators)
- the protection of persons other than the persons at work against hazards to the health and safety arising out of or in connection with the activities of persons at work **(public)**
- Establish an advisory council regarding OHS maters

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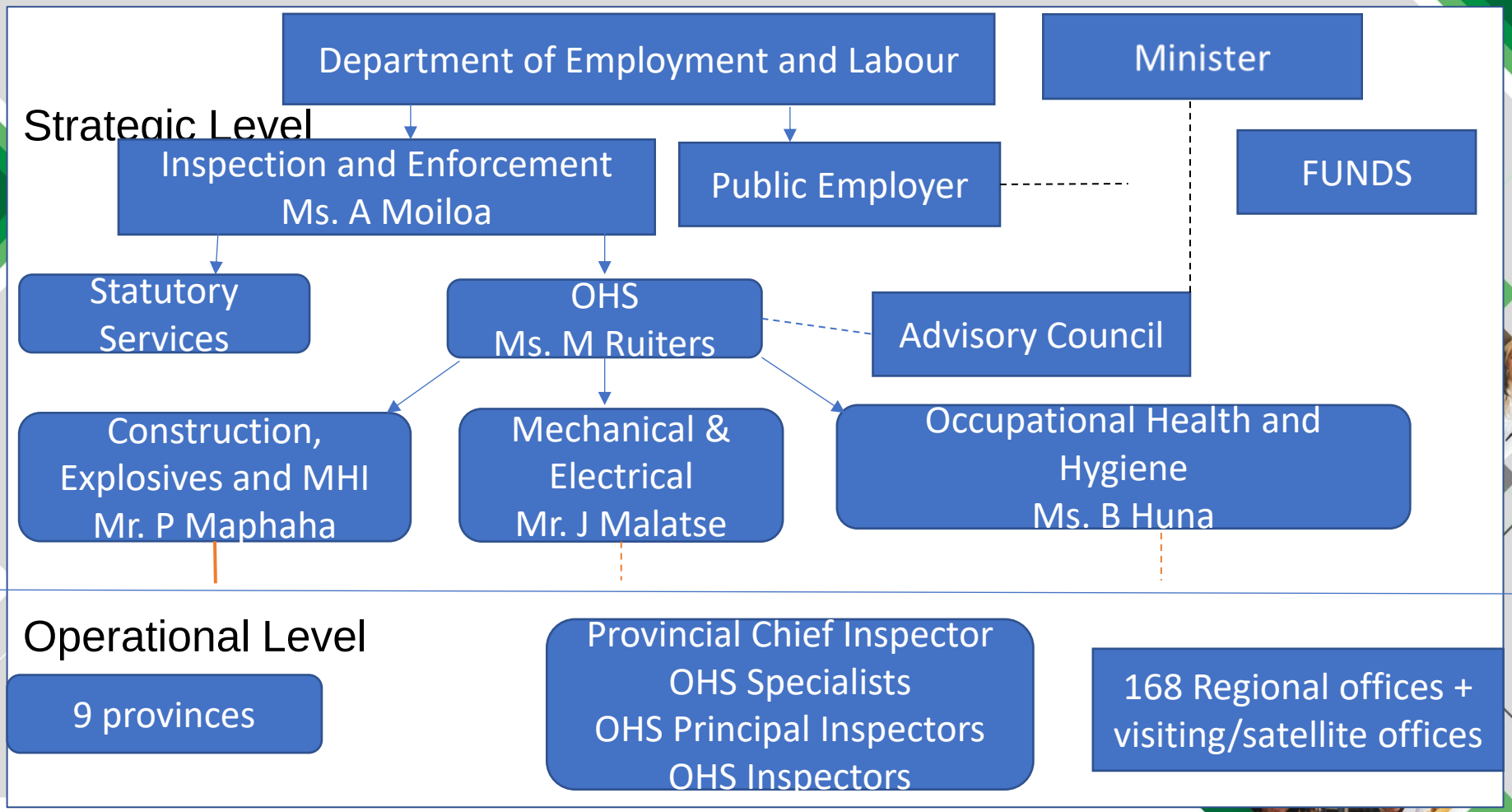
Organogram



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Advisory Council

OHS Act imposes a duty to form an Advisory Council in terms of Section 3 and their functions include to :

1 (a) advise the Minister with regard to:

(i) matters of policy arising out of or in connection with the application of the provisions of this Act;

(ii) any matter relating to occupational health and safety;

(b) perform the functions assigned to it by this Act or referred to it by the Minister.

2(c) advise the Department concerning-

(i) the formulation and publication of standards, specifications or other forms of guidance for the purpose of assisting employers, employees and users to maintain appropriate standards of occupational health and safety;

(ii) the promotion of education and training in occupational health and safety; and

(iii) the collection and dissemination of information on occupational health and safety.

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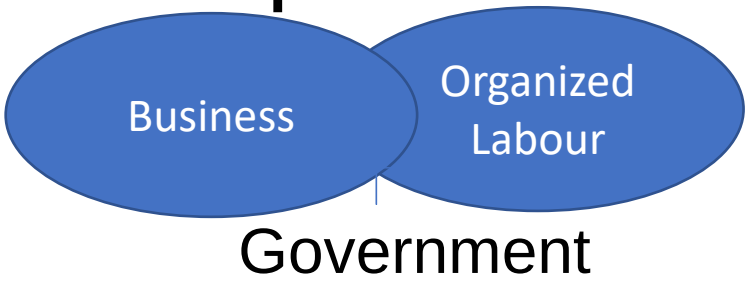
Advisory Council

Composition: Tripartite coalition



- Chairperson : Ms. M Ruiters – **Chief Inspector**)

- Members: CI, CF, DOH, DMR, OMP, OHH, OHS, Business & Labour

Technical Committee

Establishment of Technical Committee of the Council

- Section 6 (2)
- A member of a technical committee shall be appointed by the Council by reason of his knowledge of the matter for which the committee is established, and such a member need not be a member of the Council.

Regulations

- Section 43(1)(b)(vii)

….**the production, processing, use, handling, storage or transport of and the exposure to employees and other persons to, hazardous articles, substances.....**

- Section 43(1)(f)

"as to the registration of plant and machinery and the fee payable to the State in respect of such registration;

Major Hazard Installation Regulations

Major hazard installation is defined in the Occupational Health and Safety Act, 1993 as an installation:

(a) where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily;

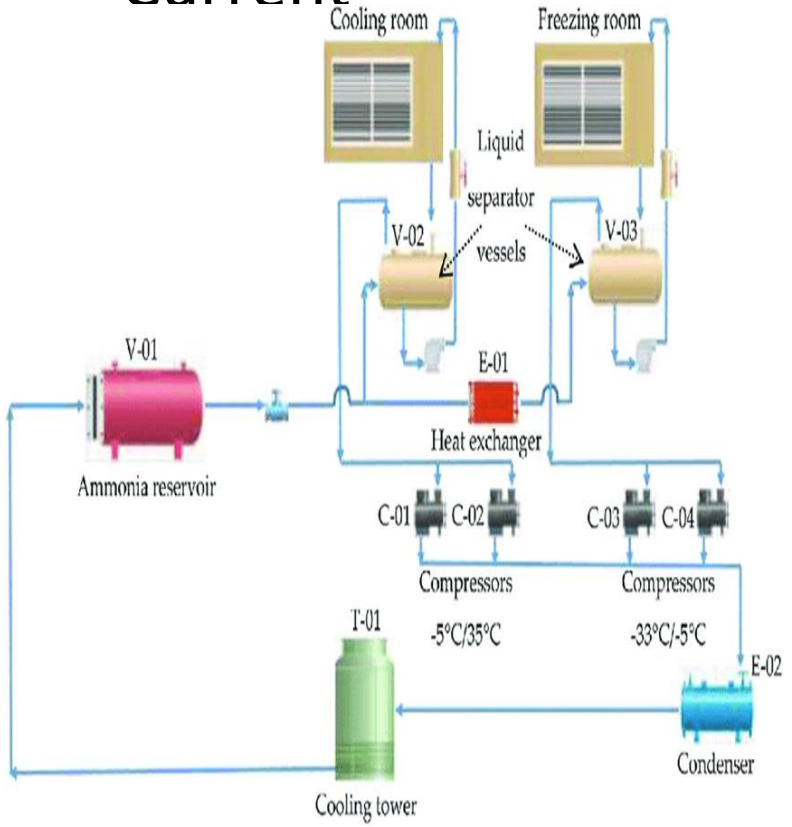
or

(b) where any substance is produced, processed, used, handled or stored in such a form and quantity that it has the potential to cause a major incident;

"installation" *means a technical unit within an establishment, above or below ground level, in which substances are produced, used and stored and which includes all the equipment, structures, pipework, machinery, tools, railway sidings and quays, warehouses and similar structures necessary for the operation of that installation;*

Now

Current


Cooling room
Freezing room
Liquid
separator
vessels
V-02
V-03
V-01
E-01
Heat exchanger
Ammonia reservoir
C-01
C-02
C-03
C-04
Compressors
Compressors
T-01
-5°C/35°C
-33°C/-5°C
E-02
Condenser
Cooling tower

Major Hazard Installation Regulations

Regulation 2. Scope of Application:

applies to major hazard installations that keep

- Chapter 1 : named substances
- Chapter 2 : categories according to hazards e.g. Toxicity, Flammability, and etc.
- Chapter 3 : major hazard pipelines

  3 classes: Low, Medium and High

Exclusions: mining, nuclear installations, offshore installations, rolling stock in transit (airways, waterways, road and on rail) and the intermediary stops in between, explosives except class 5.1- non sensitized oxidizers such as ammonium nitrate emulsions)

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Major Hazard Installation Regulations, 2022

Aims, are to ensure the establishments/installations:

1. designed for purpose and build for safety
2. located in correct areas and will not pose unnecessary danger to public members
3. Affected and interested parties are informed about the status of the MHI and the dangers they pose to the neighboring companies and the vulnerable (schools, airports, hospitals, churches, places of gathering, prisons and many others not mentioned)
4. Emergency Preparedness plan in place

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Major Hazard Installation Regulations, 2022

Designing for purpose and building for safety

- In accordance with best engineering practices and standard by a competent person
- All the MHI should be **Approved** and **legally permitted in writing** by Local Government
- MHI Reg. 4 (3) (a), REG 14 read with section 4 of NBR&BSA, 1977

(3) Any **application** referred to in subsection (2) shall-

(a) **contain the name and address of the applicant** and, if the applicant is not the owner of the land on which the building in question is to be erected, of the **owner of such land**;

(b) be accompanied by **such plans, specifications, documents and information** as may be required by or under this Act, and by such particulars as may be required by the local authority in question for the carrying out of the objects and purposes of this Act.

Major Hazard Installation Regulations, 2022

Quantitative risk assessment

"What is the risk?" we are really asking

- three questions:
  1. What can go wrong?,
  2. how likely is it to happen? and
  3. what are the consequences if it does happen?
- Answers:
  1. "risk scenarios" – failures (loss of containment due to ruptures, releases, overfilling..)
  2. Probabilities – literature review and known historical incidents
  3. Consequences/impact - confined explosions, toxic releases, fire

Major Hazard Installation Regulations, 2022

- AIA: make a judgement on the suitability of an establishment by using systematic approach that uses numerical data to evaluate and understand the potential impacts of risk associated with the materials being used.
- technical software used and its version (TR 54 v6)

e.g. TNO specialised software: Netherlands Organisation for Applied Scientific Research

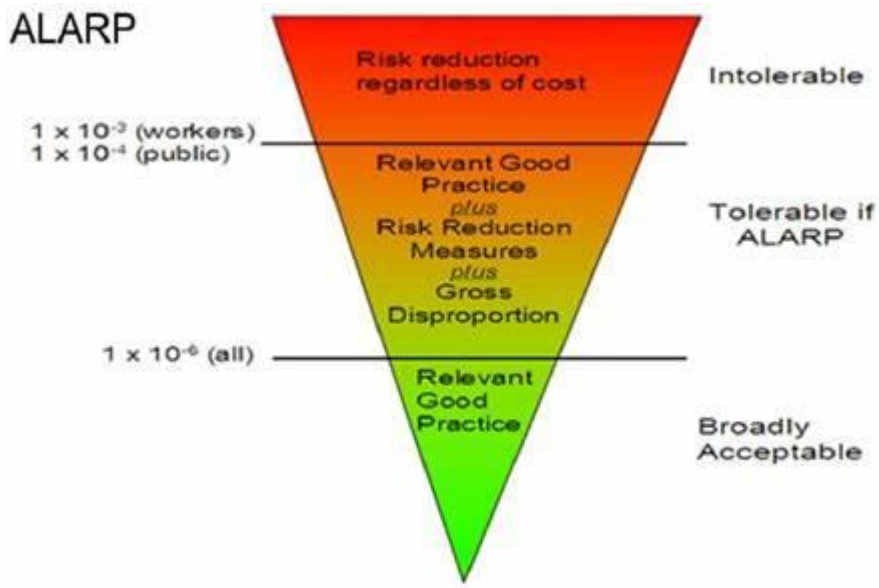
Phast and Safeti: tool used for consequences and risk analysis

…..Gexcon Riskcurves software

- model/simulate various accident scenarios, model dispersions of hazmat and assess the potential impacts on populations and buildings

Major Hazard Installation Regulations, 2022

2. ALARP PRINCIPLE



broadly acceptable means risks that are broadly acceptable and generally regarded as insignificant and adequately controlled.

Tolerable: means risks that can be managed and controlled

Intolerable means risks that are generally regarded as unacceptable irrespective of the level of benefits associated with the activity.

Major Hazard Installation Regulations, 2022

Gathering of Information

- Name and location of the establishment
- Process description
- Weather patterns relevant to QRA for the area of the installation,
- Existing land use surrounding the installation/establishment being assessed,
- Where information is available from the installation itself, from a visual inspection of area or from the Local Authorities, identify the neighbouring establishments including other hazardous installations and vulnerable developments / sensitive receptors in the vicinity of the establishment,
- Population data for the establishment and the surrounding area,
- Technical details of the installations being assessed within the establishment

Major Hazard Installation Regulations, 2022

HAZID and HAZAN

- techniques referred in SANS 31010:2010
- Hazard Analysis (HAZAN) - A Process Hazard Analysis is considered particularly suitable for a quantitative risk assessment
- Hazardous Material (Hazmat) - SANS 10228 and information from suitable sources (e.g. material safety datasheets, SANS 10234, the Risk Phrases associated with the material) can be used to determine the hazardous nature of each substance.
- containment systems: system could be a single vessel or multiple interconnected vessels, pipes, pumps
- System limiters: control valves that close automatically, intermittent release valves

Major Hazard Installation Regulations, 2022

HAZAN

- failure scenario including descriptions of the failure modes, postulated causes, preventative measures in place, expected consequences of the hazardous events (may be more than one e.g. toxic and flammable) and protective / mitigating measures in place
- **credible scenario** is major hazard scenario that has potential to result in harm or damages to both workers and the public
- **worst case scenario** is the credible major hazard scenario with the largest impact zone, i.e. with the greatest distance to the specified modelling endpoint.

Major Hazard Installation Regulations, 2022

CONSEQUENCES ANALYSIS

- describes the extent of impacts from major events
- provide guidance to emergency planning

STEP 1

- estimate the consequences by determining the physical process (i.e. release rate and duration), the area of spread, the evaporation, subsequent atmospheric dispersion of the airborne cloud or, in the case of ignition, the resulting thermal radiation or the overpressures from an explosion

STEP 2

- estimate the severity of these consequences on humans, plant structures/building and adjacent hazardous installations, e.g. the level of harm, injury and fatality due to inhalation of the harmful gases, exposure to radiation or overpressure.

Major Hazard Installation Regulations, 2022

Weather and wind

- Recent and reliable weather data shall be used, preferably from the South African Weather Services.
- **Population Data**

<u>Population Density</u>

- sources of population data:
  - SA Statistics latest population census data
  - SANS 10400
  - Local town planning data (if available)
  - The Green Book Chapter 7

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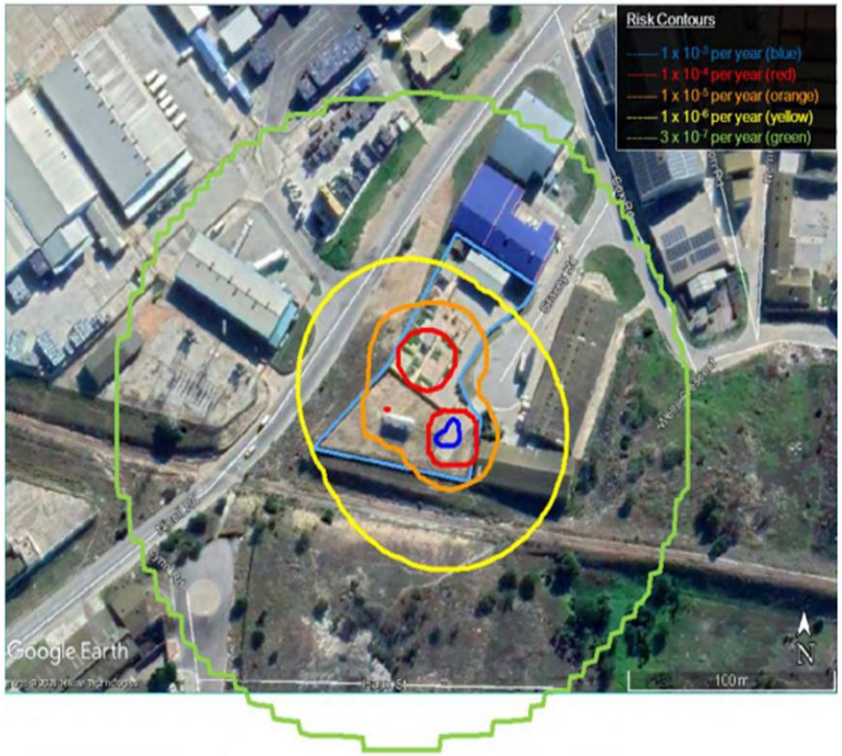
FN Lethality plots

- Individual (1%)

Societal



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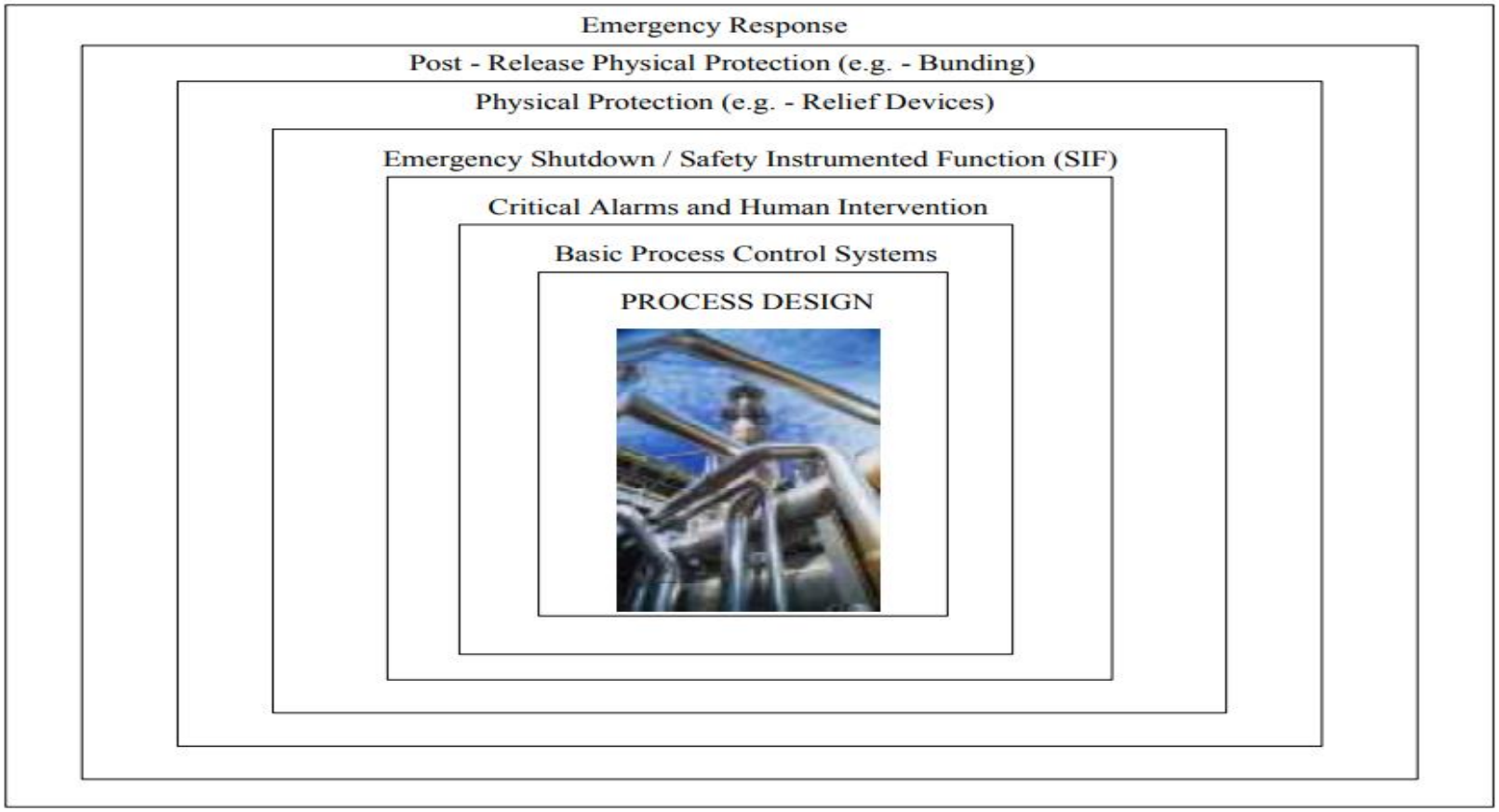
Lines of Defence/Layers of Protection Analysis in the COMAH Context

Figure 1.1 Lines of Defence



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Key Requirements:

Public participation and consultation with neighbors and the affected

Registration of MHI establishment

permitted by local government/authority

Provided in terms of regulation 4 and 5, plus payment of prescribed fees

Regulation 15: Emergency preparedness plans

Continual updating of information and integrity maintenance

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MHI Advisory Committee

Regulation 20: MHI Advisory Committee

20. (1) The chief inspector may, with the approval of the Advisory Council for Occupational Health and Safety, establish an MHI Advisory Committee to advise on any matter related to major hazard installations, codes, standards and training requirements: Provided that any accredited or approved training must be in accordance with South African Qualifications Authority standards

Regulation 23

Closure

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Planet MHI

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Thank You…

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